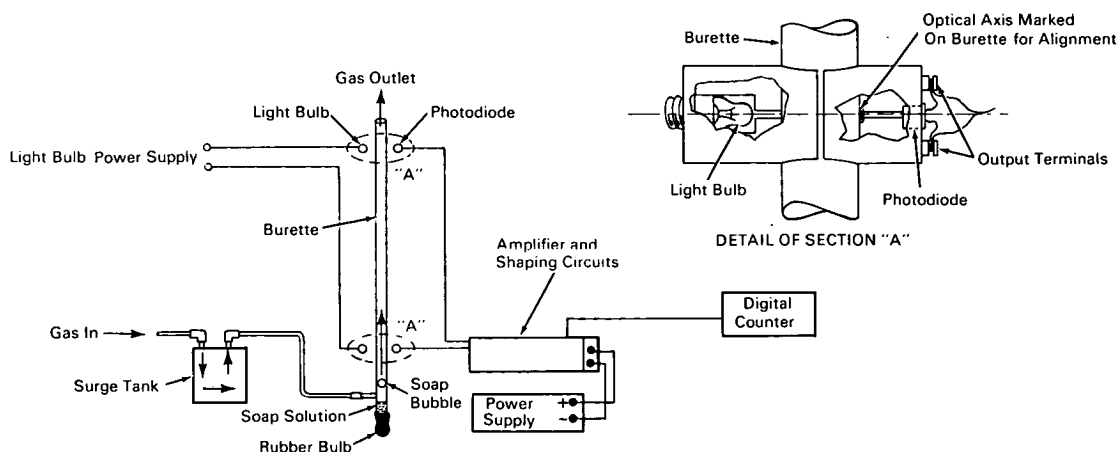


NASA TECH BRIEF



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Instrument Calibrates Low Gas-Rate Flowmeters



The problem: Calibrating flowmeters used for measuring low gas-flow rates (60 to 1000 milliliters per minute).

The solution: Electronically measuring the transit time of a soap bubble carried by the gas stream between two fixed points in a burette.

How it's done: A light source and a photodiode are positioned on opposite sides of each of two fixed points on a graduated burette. Soap bubbles are injected into the gas stream by squeezing a rubber bulb connected to a soap solution at the bottom of the burette. The first bubble to enter the burette cuts off the light beam from the lower photodiode which then triggers a pulse to an amplifier. The amplified pulse is fed to a Schmitt trigger circuit which applies a narrow square-wave pulse to a flip-flop circuit connected to a digital counter. (Once the flip-flop circuit is turned on, it is insensitive to pulses generated by succeeding bubbles.) The digital counter times the passage of the bubble through the burette until it passes the light beam

at the upper photodiode. At this time, another pulse is generated and fed through a second amplifier and shaping circuit to a flip-flop circuit, which applies an off pulse to the counter. The counter reading indicates the transit time of the bubble between the two fixed points on the burette. Since the distance between these points and the cross-sectional area of the burette are accurately known, the gas flow rate is readily computed.

Notes:

1. This experimental system has been used to measure low gas-flow rates with an accuracy of better than one percent.
2. Inquiries concerning this invention may be directed to:

Technology Utilization Officer
Manned Spacecraft Center
P.O. Box 1537
Houston, Texas, 77001
Reference: B65-10137

(continued overleaf)

Patent status: NASA encourages the immediate commercial use of this invention. Inquiries about obtaining rights for its commercial use may be made to NASA, Code AGP, Washington, D.C., 20546.

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